NO. 242
LIBRARY
Ramsey County Medical Society
ST. PAUL, MINN.

Cleveland Clinic Quarterly

A Bulletin Published by
The Staff of the Cleveland Clinic
CLEVELAND, OHIO

Vol. 9 OCTOBER, 1942 No. 4

CONTENTS

Current Trends in the Treatment of Jejunal Ulcer
E. N. Collins, M.D., Section on Gastrointestinal Diseases, and G. J. Ward, M.D., Fellow in Medicine 159

Hemiplegia and Cerebrovascular Disease
L. J. Karnosh, M.D., Consultant in Neuropsychiatry 165

Leiomyoma of the Ileum
T. E. Jones, M.D., Department of Surgery, and R. E. Brubaker, M.D., Department of Surgery 173

The Surgical Treatment of Prostatic Disease
C. C. Higgins, M.D., Department of Genito-Urinary Surgery 178

Myotonia Acquisita
Wm. A. Nosik, M.D., Department of Neurological Surgery and E. W. Shannon, M.D., Fellow in Surgery 185

Diverticulum of the Esophagus
R. S. Dinsmore, M.D., Department of Surgery 187

CLEVELAND CLINIC QUARTERLY

Issued in four numbers during the year; one in January, one in April, one in July and one in October, by Cleveland Clinic Foundation, 2020 East 93rd Street, Cleveland, Ohio.

Entered as second-class matter March 4, 1935, at the Post Office at Cleveland, Ohio, under the Act of August 24, 1912.

CURRENT TRENDS IN THE TREATMENT OF JEJUNAL ULCER

E. N. COLLINS, M.D. and G. J. WARD, M.D.

Until recent years the treatment of jejunal ulcer was considered a surgical problem. Recent communications show a trend toward medical management, except in patients with obvious indications for immediate surgery, such as perforation or gastrojejunocolic fistula. In a series of 29 consecutive cases observed at the Cleveland Clinic during the years 1930-1941, inclusive, immediate surgery was used in 4 cases, and medical management was instituted in 25 cases. Of the latter group 7 patients were not followed after the initial period of treatment, but 18 patients are known to have continued with medical management alone. The unusual swing of the pendulum to medical management prompted this review.

In recent years nonabsorbable antacids have been used in the treatment of peptic ulcer. The use of aluminum hydroxide gel was considered an important factor in the medical management of this group of patients.

DEFINITION

In this study the term "jejunal ulcer" includes ulcers which develop subsequent to gastric surgery in the region of the anastomosis between the stomach and jejunum. Synonymous terms in the literature are stomal, anastomotic, or marginal ulcer. All patients had evidence of active jejunal ulcer by x-ray or gastroscopic examination, or both, at the time the diagnosis was established.

SURGICAL INDICATIONS

The 4 patients undergoing surgery had serious complications of jejunal ulcer. Two patients had subacute perforations with abscess formation, and two had gastrojejunocolic fistulas. Other complications of jejunal ulcer, such as obstruction and massive hemorrhage, when not controlled by adequate medical management, call for surgical intervention. In fact, as in the case of primary peptic ulcer, any patient with jejunal ulcer who does not respond satisfactorily to medical management is considered as having a surgical problem.

CLINICAL DATA

Of the 29 cases in this series, 5 patients had had gastric resection, and 24 patients had had gastroenterostomy prior to the development

of jejunal ulcer. The sex incidence was 26 men and 3 women. Symptoms were similar to the original complaints in that the abdominal distress occurred from one to 3 hours after meals, but the location of the distress was usually to the left of and above the umbilicus, instead of high in the epigastrium. In certain instances the pain radiated to the groin simulating ureteral colic. Relief of symptoms by taking food was not as commonly observed as in the case of simple uncomplicated primary peptic ulcer. Six patients gave a history of hemorrhage, and 3 patients had temporary obstruction. The pain was more severe and the incidence of night pain was greater than is commonly seen in patients with primary peptic ulcer. Tenderness to the left of the umbilicus was commonly observed, and the presence of a tender mass was established in some instances.

The presence of a high level of gastric free acidity by aspiration was observed in most cases, but care had to be used to make certain that the tip of the tube was in the fundus of the stomach and not in the jejunum. In the examination of stools while the patient was on a meat-free diet, a positive benzidine test for occult blood was not present in all instances.

X-RAY EXAMINATION

The roentgen examination gave the most important objective information. It should be emphasized that *routine* methods of roentgen examination may fail to show evidence of jejunal ulcer. Our experience with special technics in which the fluoroscopic and film examinations are divided into two parts, i.e., (1) during and after the patient swallows one or two mouthfuls of barium suspension, and (2) later after a complete filling of the stomach, has been reported[1]. Spot films with careful pressure technic at proper intervals have been added in recent years. Examinations made with the first few swallows of barium suspension and at the time the stomach is nearly empty are most likely to demonstrate a niche deformity. The presence of a dilated afferent or efferent loop, disturbances in motility, flexibility, and localized tenderness are also important.

GASTROSCOPIC EXAMINATION

Gastroscopy was used when the roentgen findings were indeterminate. The patient having a gastrojejunostomy may not have gastritis, but if present, it may be a severe ulcerative form of gastritis which will have an important bearing on treatment. The experienced gastroscopist also gives information relative to the patency of the anastomosis and may see an ulcer which has not been visualized by the roentgen examination.

DISPOSITION OF PATIENTS

As previously stated, a series of 29 consecutive cases of jejunal ulcer was observed during the years 1930-1941, inclusive. Four patients had immediate operations for serious complications. It was impossible to follow 7 patients after the initial period of medical management, but 18 patients are known to have continued with medical management alone. Their progress was satisfactory when minimal requirements for adequate therapy were followed. In the few instances of recurrences of symptoms the patient had stopped management a few months after the original symptoms had subsided. Resumption of management again resulted in favorable progress.

Relief of symptoms does not mean that the ulcer is healed. The patient must be impressed with the usual life history of peptic ulcer, that it is a chronic disease, subject to spontaneous remissions and acute exacerbations, and may become complicated by perforation, obstruction, or massive hemorrhage. If favorable results are to be obtained, the patient must follow a well-ordered program the remainder of his life.

CASE REPORTS

Case 1. A 48 year old man entered the Clinic complaining of low epigastric pain relieved by food and soda. X-ray examination revealed an ulcer niche immediately below the stoma. He was placed on medical management which he followed only six months. Three months later symptoms recurred, and he had a massive hemorrhage. He resumed medical management and has made satisfactory progress since that time.

Case 2. A 44 year old man complained of epigastric pain, relieved by food or alkali, and occasional slight hematemesis. X-ray examination revealed an ulcer niche in the jejunum immediately below the stoma. The patient had a complete remission for 3 years, stopped management, and had a recurrence of symptoms. He resumed management with relief for a two year period. At that time he had a nervous breakdown and stopped management; symptoms again recurred and were again controlled by medical measures. When last seen in 1940 this patient was still following management and was symptom-free.

PRESENT PROCEDURES USED IN MEDICAL MANAGEMENT

Jejunal ulcer is usually more intractable to medical management than the original peptic ulcer. There is a greater likelihood of complications, such as perforation, hemorrhage, or obstruction.

Hospitalization is important at the start of management. Daily observations aid in determining the type of treatment indicated in the individual case. If immediate surgery is not indicated, its need may become established later if the patient's response to medical management is not satisfactory. While the patient is in the hospital, gastric aspira-

tions can be made in order to determine the suitable dosage of antacid. The patient has complete physical rest; he is impressed with the seriousness of his disease; and he learns how to take care of himself. We agree with Jordan[2] who said, "there is very little danger of overtreatment and very great danger of undertreatment of this disease".

Recently our experience with the medical management of peptic ulcer and its complications has been reported.[3, 4, 5] The same principles are used in treating jejunal ulcer. At the present time we believe minimal requirements for adequate treatment include frequent feedings and antacid therapy, in addition to physical and mental rest, and consideration of the hygienic needs of the individual. We advise the use of milk or food at least once between meals during the remainder of the patient's life. During the first year's treatment the patient takes aluminum hydroxide gel at least 4 times daily, i.e. one hour after meals and at bedtime. If there is a history of seasonal recurrences, the patient is advised to use the feedings and antacid more frequently at these times each year for 5 years, even though no symptoms are present. The healing of any one peptic ulcer does not mean that the patient will not have another ulcer. The patient must realize that he has an ulcer diathesis and that continued supervision of his management is as important as it is in patients having diabetes mellitus or pulmonary tuberculosis.

Due to present crowded conditions the patient with jejunal ulcer may not remain in the hospital longer than one week, but a period of two weeks should be the minimal requirement. The diet has become more liberal. During the first week of treatment a bland diet is used at 8 a.m., 12 noon, and 6 p.m. A glassful of milk is taken at 10 a.m., 2, 4, and 8 p.m. Thereafter a well-balanced diet including meat and citrous fruit juices is gradually added, but the 2 hour schedule of milk between meals is continued at least during the first 6 week period of treatment. Care is taken to avoid seeds, skins, and coarse fibers. Adjustment of caloric intake and the use of supplemental vitamin therapy depend on individual needs.

Aluminum hydroxide gel (stirred in ½ glass of water) is taken an hour after each meal, one hour after feedings, and at bedtime. In other words, during the first period of treatment the patient eats breakfast at 8 a.m., takes the antacid at 9 a.m., milk or food the next hour, etc., so that every hour during waking hours he takes either food or antacid. In patients having evidence of continued night secretion the antacid is also given at 12 midnight and 3 a.m. during the first 1 or 2 weeks' treatment. The amount given depends on the gastric free acidity as determined by gastric aspirations, but it has not been less than 2

drachms per dose during the day time hours and 1 ounce during the evening and night hours. Our experience corresponds with that of Flexner and Kniazuk[6] in that the action of aluminum hydroxide gel is prolonged when large doses are given. Our aim is not to neutralize gastric acidity completely, but to keep the level of free acidity sufficiently low to prevent activation of pepsinogen. The beneficial effect of aluminum hydroxide may be due to several factors and not to its antacid properties alone. Schiffrin and Komarov[7] have shown that it will inactivate pepsin itself, even in the presence of acid. Sufficient liquid petrolatum, heavy magnesium oxide, or aromatic fluid extract of cascara sagrada is added to prevent constipation until the patient is including sufficient vegetables and fruit in his diet to assure proper bowel function.

Progress roentgen examinations and/or gastroscopic examinations are made at least once before the first 6 week period of treatment is completed. This aids in determining the frequency of feedings and antacid administration for the future. As already mentioned, the patient is advised to take milk or food at least once between meals and to use the antacid at least 4 times daily (usually ½ to 1 ounce dosage) during the first year of treatment.

COMMENT

The indications for surgery in peptic ulcer have become conservative in recent years. When surgery is used, radical gastric resections have been done more frequently. In spite of this, jejunal ulcers continue to develop. In former years the patient was lead to believe that he was "cured" after having had an operation, and so was free from all restrictions postoperatively. At the present time, in view of the well-known "ulcer diathesis" factor, we know that all patients in whom a diagnosis of peptic ulcer is established should modify their living habits for life, regardless of whether medical or surgical management is used.

The development of jejunal ulcer emphasizes the need for continued management after operation. We believe fewer jejunal ulcers would form if the patient would include milk or food at least once between meals, and use an antacid at least 4 times daily for a few months postoperatively, as well as at the times of his usual seasonal recurrences each year.

Too often frequent feedings and antacids are used only for the temporary relief of symptoms. In our experience an adequate program requires these procedures **regardless of the absence of symptoms.**

The clinician may believe medical management has been followed **without realizing that it has not been adequate.** To evaluate treat-

ment inquiry must be made regarding not only the **frequency** of feedings and antacids used each day, but also the **quantities** used.

SUMMARY

A series of 29 consecutive cases of jejunal ulcer has been briefly reviewed. Four patients had surgical treatment, there were no follow-up studies in 7 cases, but 18 patients are known to have continued with medical management alone.

This experience is in keeping with current trends in therapy and confirms the belief that unless the patient has obvious indications for immediate surgery, adequate medical management should be used before establishing the need for surgery.

In our experience medical management, including the use of aluminum hydroxide gel, may prove effective if the patient follows a well-ordered program over a long period of time.

BIBLIOGRAPHY

1. Collins, E. N.: Fluoroscopic examination in patients suspected of having peptic ulcer. S. Clin. N. A., 16:923-936 (August) 1936.
2. Jordan, S.: Problems of peptic ulcer. Surg. Clin. N. A., 21:665-677 (June) 1941.
3. Collins, E. N., Pritchett, C. P., and Rossmiller, H. R.: Use of aluminum hydroxide in treatment of peptic ulcer; follow-up studies of 246 cases. J. A. M. A., 116:109-111 (January 11) 1941.
4. Collins, E. N., and Knowlton, R. S.: Review of 141 consecutive cases of massive hemorrhage from upper gastrointestinal tract. Ohio State M. J., 35:1175-1180 (November) 1939.
5. Collins, E. N., and Rossmiller, H. R.: Obstructive symptoms versus pyloric obstruction. Surg. Clin. N. A., 21:1445-1505 (October) 1941.
6. Flexner J., and Kniazuk, M.: Method for continuous recording of gastric pH in Situ; Evaluation of efficacy of certain antacids. Am. J. Digest Dis., 8:45-47 (February) 1941.
7. Schiffrin, M. J. and Komarov, S. A.: Inactivation of pepsin by compounds of aluminum and magnesium. Am. J. Dig. Dis., 8:215-217 (June) 1941.

HEMIPLEGIA AND CEREBROVASCULAR DISEASE

LOUIS J. KARNOSH, M. D.

Hemiplegia in the aging patient is usually regarded as a stereotyped clinical event and the lesion producing it an equally stereotyped pathological disturbance. Much of this casual attitude toward this condition is probably due to the influence of Charcot's forceful and convincing manner of designating the so-called lenticulostriate branch of the middle cerebral circulation as "the artery of apoplexy".

More extended and detailed studies by clinicians and pathologists have demonstrated no Greek simplicity in the problem of apoplexy. There are variations here as there are in other morbid processes in other organs.

BLOOD SUPPLY OF INTERNAL CAPSULE

The blood supply of the internal capsule and of the adjacent basal ganglia, which are almost invariably involved in the vascular lesion of hemiplegia, is by no means a settled matter. As pointed out by Alexander,[1] textbooks of anatomy are rather vague and perfunctory in describing this phase of cerebral circulation, and many still refer to a definite lenticulostriate artery as if it were a constant and clearly demonstrable structure.

Dismissing the concept of a single large "artery of apoplexy", Alexander[1] demonstrated by an ingenious injection technic that the vulnerable internal capsule and the adjoining gray masses are supplied by a series of small arteries or arterioles which arise directly from the large vessels as these emerge from the circle of Willis. These small arteries are arranged in tiers or clusters and at right angles from the parent artery, and most of them penetrate the brain substance in the anterior perforated space. In every respect, they resemble the arterioles penetrating from the circle of Willis into the hypothalamus and those branching from the basilar artery which enter the pons. Like the latter, they are readily subject to thromboses and to miliary aneurysms.

Most of these striate arterioles arise from the proximal portion of the middle cerebral artery. The most crucial part of the internal capsule, that is, the knee, may have a small branch directly from the internal carotid artery itself. (See Fig. 1.) Finally, there is the longest and most clearly defined vessel known as the anterior choroidal artery which also arises from the internal carotid and supplies the most caudal portion of the internal capsule and other significant structures, which give its syndrome a special distinction as pointed out by Abbie.[2]

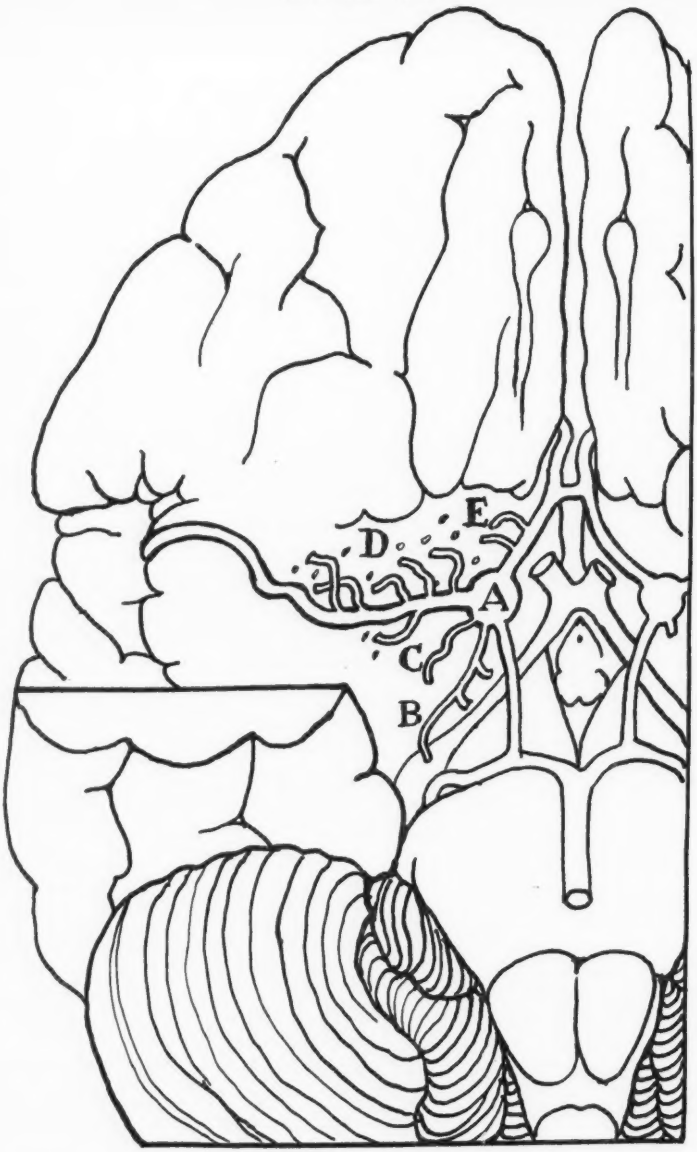


FIGURE 1. Scheme showing the position of the arterioles which supply the basal ganglia and the internal capsule (after Alexander).
A—internal carotid artery, B—anterior choroidal artery, C—capsular artery arising directly from the internal carotid, D—striate arterioles from the middle cerebral artery, E—striate arterioles from the anterior cerebral artery. All the striate arterioles enter the brain through the anterior perforated substance.

SURVEY OF MATERIAL

A survey of the clinical records and the necropsy reports of 185 patients who presented some degree of hemiplegia was made by the writer and confirms the well recognized propensity of the middle cerebral circulation to both hemorrhage and softening (Fig. 2).

In 110 cases of cerebral hemorrhage 87 brains, or 80 per cent, presented the lesion in the middle cerebral branches. In 66 brains with thrombosis, 77 per cent revealed the softening in the same circulation. Hence, the fact is clearly presented that the middle cerebral artery with its branches is the structure which is most vulnerable to the most common lesion appearing in the human brain.

In addition to this garden variety of vascular brain disease, wherein the bleeding or softening was found to be in and about the basal ganglia, the material included 5 patients with hemiplegia who presented a primary hemorrhage in the pons and 4 cases with softening in the medulla.

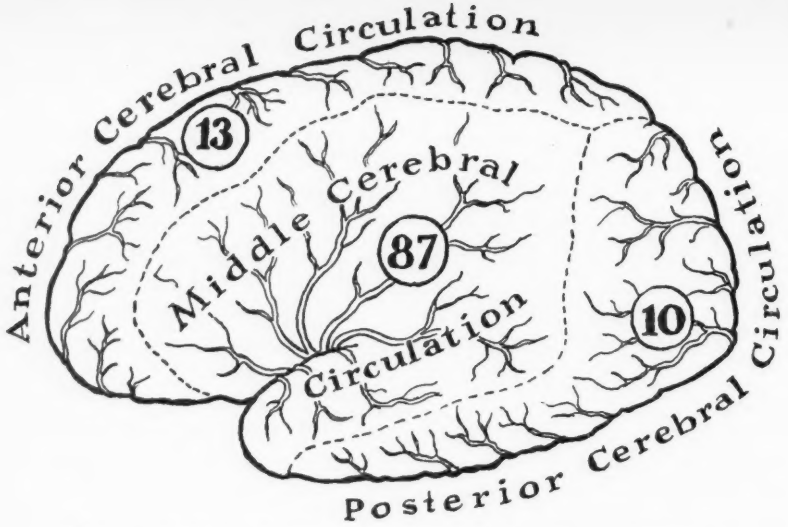
As indicated before, all these patients displayed clinically at one time or another some degree of hemiplegia or weakness of one side of the body. By scrutinizing this symptom as to quality and severity, by inquiring into associated signs such as aphasia, sensory defects such as a concomitant hemianesthesia or hemianopsia, an attempt was made to furnish a rough correlation between the clinical features and the general site of the offending lesion.

Naturally, many of the clinical descriptions of the paralysis in the hospital charts were incomplete, sketchy, and often very confusing. For this reason, only the crudest delineation of hemiplegic types can be offered. Since this study is essentially a clinico-anatomical correlation, no differentiation will be made between thrombosis and hemorrhage.

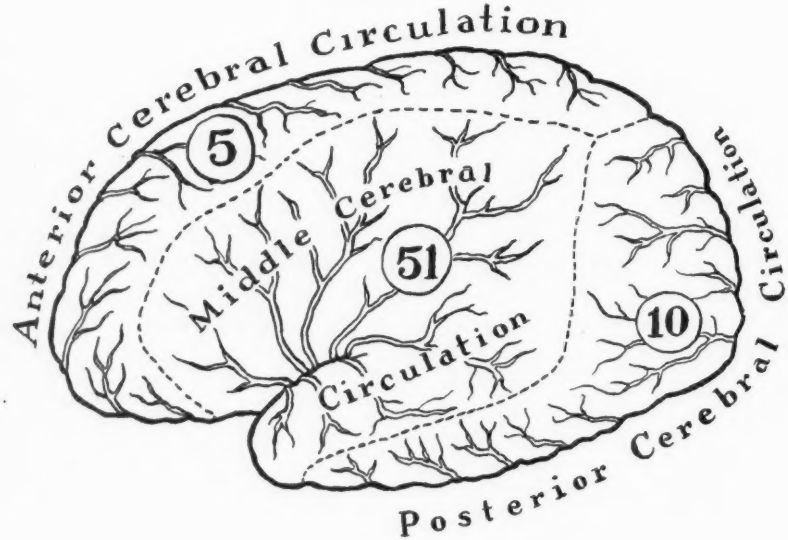
ANATOMICAL SITE OF APOPLEXY

A quick inspection of the lesion in 102 specimens, which constitute 55 per cent of the entire collection, demonstrated the most typical anatomical site of apoplexy.

Contrary to common impression, this site is not in the internal capsule, but actually involves the external capsule, the upper and outer part of the putamen and that part of the corona radiata which carries the long fibres from the facial and arm area. This is in accord with the findings of Freeman[3] who believes that this vulnerable zone is the site of an embryonic cleavage. According to Alexander,[1] this area is supplied, not



The relative frequency of **Hemorrhage** *in the three main cerebral circulations*



The relative frequency of **Softening** *in the three main cerebral circulations*

FIGURE 2

by a lenticulostriate artery, but by the most distal striatal arterioles which arise directly from the middle cerebral artery.

If this be the typical vascular insult to the brain, the question arises as to what form of hemiplegia is its typical counterpart. A composite of all the data on the charts would indicate that such a lesion produces the simplest form of hemiplegia. The infirmity is essentially a spastic paralysis involving the face and arm, but rarely the lower extremity. Tendon reflexes are invariably exaggerated and pathological responses such as the Babinski and the Hoffman are the rule. Motor aphasia is common if the paralysis is on the right side. There are rarely associated disturbances such as hemianopsia, although a small number of these patients complained of vague parasthesias on the paralyzed side. Only one chart recorded a sharply defined homolateral anesthesia to touch.

DEEPER CEREBRAL LESIONS WITH ATYPICAL HEMIPLEGIAS

In 22 specimens the area of softening or hemorrhage was more extensive and more centrally located, the lesion involving the internal capsule, the globus pallidus, and even the thalamus. In 5 cases the hemorrhage extended into the lateral and third ventricles. This group represents in general the more severe and more short-lived processes, for the clinical story was usually one of rapid onset, severe shock, coma, and short period of survival.

Because of the profound stupor or obfuscation, clinical description was found to be exceptionally meager. The hemiplegia in this second group was usually complete, involving face, arm, and leg to a pronounced degree. Tendon reflexes were generally absent or sluggish; the muscle tone was flaccid in 15 cases. Even in those instances where reflex function was restored, the limbs usually remained in flaccid state.

Sensory disturbances were found in 10 of these patients. This usually consisted of an hypoesthesia to both touch and pin prick on the paralyzed side of the body, the facial area frequently escaping the sensory defect.

That so many of the patients in this group were found to have such a sensory disturbance is a favorable comment on clinical acumen, for it must be emphasized that this symptom is only elicited with difficulty in an elderly or mentally torpid individual.

This frequent coexistence of flaccid hemiplegia and hemianesthesia may not be entirely a fortuitous observation. When hemianesthesia is present, it is implied that the brain lesion involves either the thalamus or the sensory tracts. Verhart[4] made serial sections in 21 cases of hemiplegia and concluded that the flaccid form occurs when both the sensory

and pyramidal systems are destroyed. Aring[5] also claims that flaccid hemiplegia is found in deep cerebral lesions but attributes the cause to destruction of the basal ganglia rather than the thalamus. Davison and Bieber[6] in their studies of cerebral flaccidity in man likewise found hemianesthesia in all their cases of flaccid paralysis, but do not regard this sensory disturbance as a causative factor. None the less, this concept of the production of flaccid hemiplegia appears more plausable to the clinician than that offered by the Yale group[7] of neurophysiologists who consider this phenomenon to be an expression of injury to the purely motor area of the cortex.

Hence, in those hemiplegias showing the deeper and more mesial lesion, the clinical picture may be one of flaccid hemiparalysis with or without a hemianesthesia.

In two of the patients in this group the clinical findings included the complete triad of flaccid hemiplegia, hemianesthesia, and hemianopsia. Here, it is believed, the lesion was specifically one in the anterior choroidal artery, for this interesting blood vessel supplies not only the pyramidal fibres, but also the ascending sensory tracts to the thalamus and the external geniculate body where the optic tract is interrupted. In one case a small ruptured aneurysm was actually revealed in this artery near its junction with the internal carotid.

HEMIPLEGIA IN PONTINE HEMORRHAGE

Hemorrhage and thrombosis along the brain stem are not as quickly detected as are such disturbances in the cerebrum itself. This applies particularly to hemorrhage into the pons.

Only in one instance out of the 5 cases of pontine hemorrhage was the diagnosis accurately made; in the remaining 4 the condition was regarded as a cerebral ictus. In the latter group the clinical course was rapid, coma quickly intervened, and focal symptoms were overshadowed by the picture of total collapse.

In these pontine hemorrhages, which are not uncommon and which are frequently terminal lesions in hypertensive brain disease, the paralysis was not a clear-cut hemiplegia, but was more often a general flaccid weakness. The fever reaction was more pronounced in these patients, and respiratory difficulties were prominent. If the patient survives the acute shock phase, which is rarely the case, more focal symptoms may arise such as external squint and difficulty in swallowing, even though throat reflexes may be very active. Occasionally, there may be the peculiar symptom of compulsive laughing or crying—the syndrome of pseudobulbar palsy.

HEMIPLEGIA IN LESIONS OF THE MEDULLA

Hemiplegia or hemiparesis was a clinical notation in 3 of the 4 patients who were found to have a thrombosis in the lateral portion of the medulla. Strictly speaking, these individuals did not have a hemiplegia, but a hemihypotonia and a hemiataxia, although they may have complained of a unilateral subjective weakness. In this condition, which is usually due to a thrombosis of the posterior inferior cerebellar artery, the motor symptoms are indeed unilateral. The patient falls to the affected side as if he were hemiplegic, but the voluntary control of the limbs is intact. Moreover, there is usually a rotatory nystagmus, and on the weakened side there is usually a loss of pin-prick or pain sense over the trigeminal distribution of the same side. The corneal reflex therefore is frequently absent.

In the remaining 52 cases the clinical data were so scanty that no conclusions can be offered. In many of these the lesions were far too extensive to determine what vessels or groups of vessels were the actual offenders in the production of the hemorrhage or thrombosis.

SUMMARY

Only a general correlation can be made between the brain lesion of apoplexy and the type of hemiplegia which may be produced.

The middle cerebral artery with its branches, particularly its striate arterioles, furnishes the most frequent site for hemorrhage and thrombosis.

The most distal of these branches, when damaged, produces the simplest and most common form of hemiplegia, usually of the spastic type.

Deeper and more proximal branches of the middle cerebral artery are the sites of lesions which cause a more complete and more flaccid form of hemiplegia which is often associated with a homolateral hemianesthesia.

A thrombosis or hemorrhage of the anterior choroidal artery is indicated when the hemiplegia is flaccid, and there is not only an associated hemianesthesia, but also an hemianopsia.

Pontine hemorrhage produces a weakness rather than a definite hemiplegia and is usually a prelethal manifestation in malignant hypertension.

In medullary vascular disease the most common ictus is a thrombosis of the posterior inferior cerebellar artery. The unilateral weakness is

rarely a true hemiplegia, but is usually a hemihypotonia with ataxia, anesthesia of the same side of the face, and a rotatory nystagmus.

BIBLIOGRAPHY

1. Alexander, Leo.: The Vascular Supply of the Striopallidum. The Diseases of the Basal Ganglia, Research Publications, Association for Research in Nervous and Mental Diseases (Baltimore: Williams and Wilkins Co., 1942), Vol. 21, p. 77.
2. Abbie, A. A.: The clinical significance of the anterior choroidal artery. Brain, 56:233-246, 1933.
3. Freeman, Walter: Neuropathology, The Anatomical Foundation of Nervous Diseases (Philadelphia and London: W. B. Saunders Company, 1933), Cerebral hemorrhage, p. 108.
4. Verhart, W. J. C.: Flaccid hemiplegia of cerebral origin. Psychiat. en neurol. bl. 41:211-217, 1937.
5. Aring, Charles D.: Flaccid hemiplegia in man. Arch. Neurol. & Psychiat. 43:302-317 (February) 1940.
6. Davison, C., and Bieber, I.: The premotor area: Its relation to spasticity and flaccidity in man. Arch. Neurol. & Psychiat. 32:963-972 (November) 1934.
7. Fulton, J. F.: Physiology of the Nervous System (New York: Oxford University Press, 1938), p. 675; footnote 1.

LEIOMYOMA OF THE ILEUM

Report of a Case

THOMAS E. JONES, M. D. and ROBERT E. BRUBAKER, M. D.

Small intestinal neoplasms appear infrequently enough to make each case one of considerable interest. In the experience of the surgeons at the Cleveland Clinic 22 patients with small intestinal tumors verified by microscopic section have been operated on. The locations of the tumors and the pathological diagnoses were as follows:

Location	No. of Cases	Pathological Diagnosis	
Duodenum	3	Adenocarcinoma	3
Jejunum	4	Adenocarcinoma	4
Ileum	15	Adenocarcinoma	4
		Lymphosarcoma	4
		Argentaffin tumor	3
		Leiomyoma	2
		Leiomyosarcoma	1
		Spindle cell sarcoma	1

Resection was done in 13 cases, or 59 per cent of the series. Some form of palliative side-tracking operation was performed in 9 cases, or 41 per cent. The hospital mortality for the series was 27 per cent.

One case in which a leiomyoma of the ileum was resected by the senior author is of especial interest.

CASE REPORT

The patient, a man aged 34, referred to the Clinic by Dr. C. A. Hanson of Newcomerstown, Ohio, was admitted by ambulance, and while being transferred to his room he had a severe chill. He complained bitterly of lower abdominal pain and tenderness. He stated that he had been well until one year ago when he suddenly had passed dark red blood with his stools for several days. Six months later, although he had not noticed further bleeding, he had become pale and easily fatigued and had been treated for anemia of undetermined origin. Four months before admission he had had two chills. Three weeks before admission he had again had several chills, and about the same time he had begun to have increasingly severe constant pain and tenderness in the suprapubic area and pain on bowel movement.

On admission the patient was obviously in severe pain. The temperature was 103° F., and the pulse rate was 112 per minute. The positive physical findings except for pallor of the skin and mucous membranes were confined to the abdomen and rectum. There was marked tenderness over the entire lower abdomen, especially above the symphysis pubis, but the abdomen was not distended. There was an ill-defined mass in the suprapubic region. On digital rectal examination there was such exquisite tenderness in the rectovesical pouch that no further information could be obtained.

The red blood cell count was 3,500,000 per cubic centimeter, and the hemoglobin was 44 per cent.

After a few days the temperature and the lower abdominal tenderness subsided. Proctoscopic examination under anesthesia showed a large mass in the rectovesical pouch which felt cystic in one area. The mucosa of the rectum and lower sigmoid appeared normal.

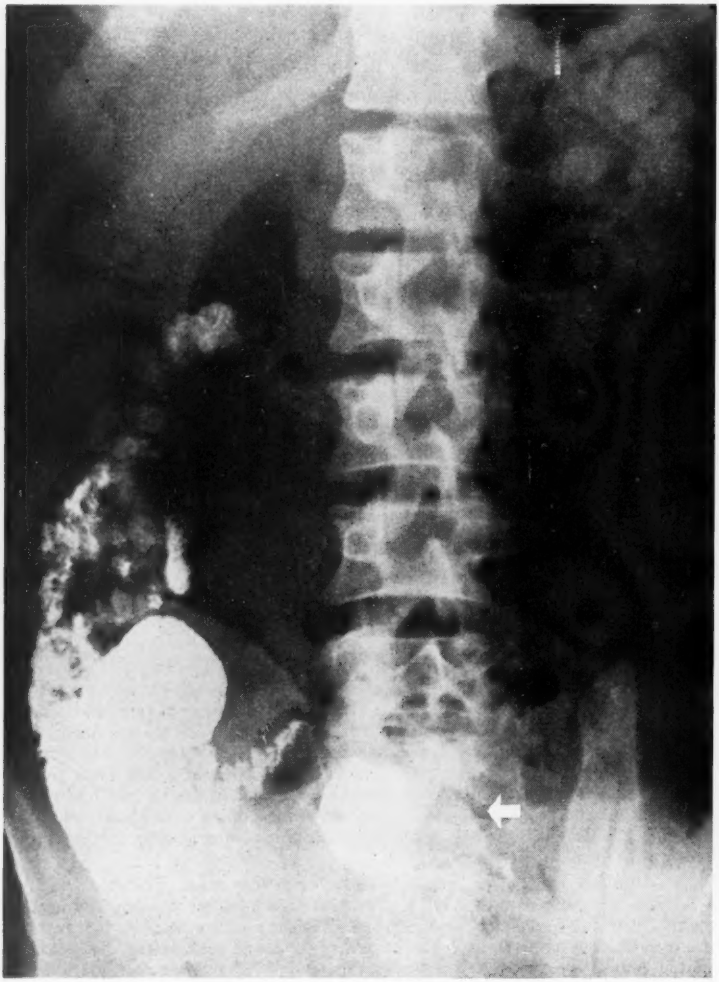


Figure 1

Roentgen examinations were made of the upper and lower intestinal tracts. Dr. Hughes of the Department of Roentgenology reported an irregular dilated loop of small intestine at the site of the mass which was present on the 4-hour retention film (Fig. 1) and again at the time of the colon x-ray, 24 hours after the ingestion of the barium meal (Fig. 2). This suggested a small intestinal tumor. The sigmoid colon was displaced far to the right.

After preparation with Miller-Abbott tube drainage and transfusions and after the establishment of fluid balance, the patient was operated upon August 18, 1942.

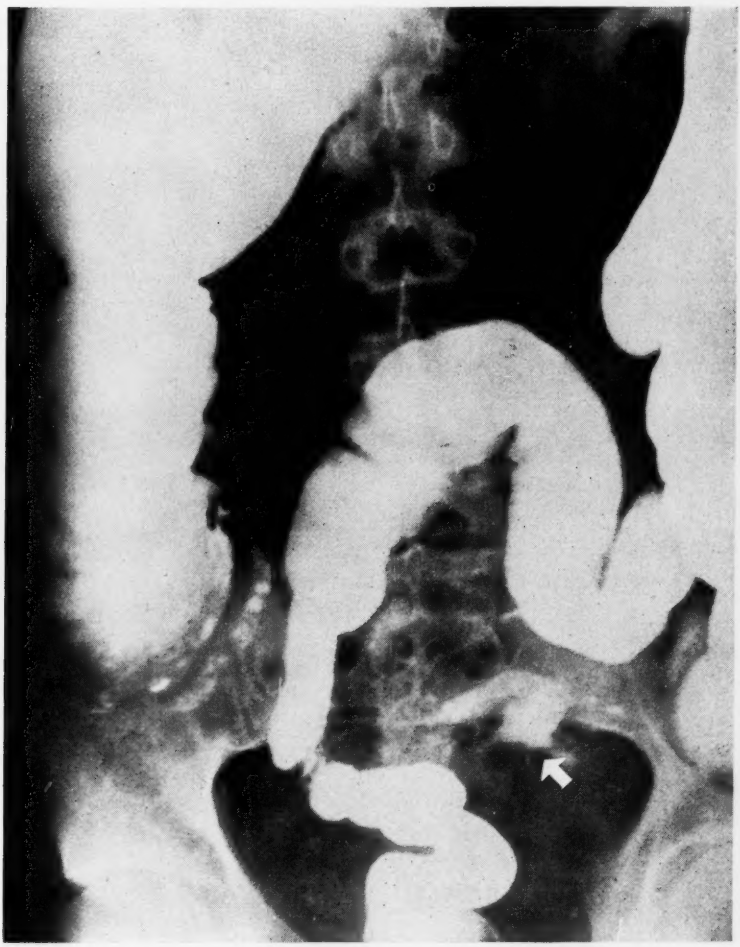


FIGURE 2

The following is a summary of the surgical notes: A large, irregular, red, meaty mass filled the entire left side of the pelvis and was densely adherent to all surrounding structures and to several loops of small bowel. The sigmoid was displaced to the right. The mass, which was delivered from the pelvis with some difficulty, appeared to arise from the antimesenteric border of a loop of ileum. An elliptical portion of the ileum including the attachment of the tumor was excised, and the bowel sutured transversely. A large sheet of rubber dam packed with gauze was placed into the pelvic basin to cover the denuded hollow formed by the dissection of the tumor. The pack was brought out the lower angle of the wound.

The postoperative course was relatively uneventful, and the patient was discharged on the twenty-fifth postoperative day. The packing within the rubber dam was removed gradually beginning the sixth day, and the entire pack was removed by the eleventh day. Three weeks later the cavity had almost entirely healed in.

The principle of the type of pack used in this case, which we believe has been generally forgotten, was suggested by Mikulicz in 1886. Its value in walling off the small intestines from unperitonealized areas is inestimable in instances such as this. It is particularly useful after extensive dissections of inflammatory masses in regional enteritis and after mobilization of adherent neoplasms of the sigmoid and splenic flexures where reperitonealization is impossible.

Dr. Graham of the Department of Pathology described the gross specimen as follows: "The specimen consists of a tumor mass removed from the small intestine. The tissue weighs 535 grams and measures 13 x 12 x 7 centimeters. It appears to be entirely encapsulated, and at one pole there is an elliptical piece of small intestine resected from the antimesenteric border. The intestinal mucosa appears normal except for a fistulous opening which leads into a cavity within the tumor. The tumor appears to have arisen within the wall of the intestine and extended outward. The cross section of the tumor shows what appears to be an entirely encapsulated growth about one-half of which adjacent to the intestine is converted into a large cystic cavity lined with necrotic tissue and inflammatory exudate. The more solid remainder is the seat of ex-

Figure 3A

Figure 3B

tensive infarction and necrosis. Beneath the capsule adjacent to the intestine there is an irregular mass of less degenerated solid white cellular tumor tissue. Microscopical sections show a tumor mass made up of fairly well differentiated, quite uniform, nonstriated muscular tissue. Histologically the tumor appears to be benign." Fig. 3A shows the external aspect of the gross fixed specimen. A white string has been passed through the fistula from the lumen of the ileum into the interior of the cavity. Fig. 3B shows a cross section. The white string emerges from the fistula into the necrotic cavity adjacent to the intestine.

SUMMARY

This case presents several interesting points.

(1) Chills and fever are rare as a presenting symptom in small intestinal neoplasms. Presumably in this instance they were due to extensive recurrent infarction and necrosis within the tumor.

(2) The retained barium shown on the retention and colon films was probably within the cavity of the tumor.

(3) The presence of a fistula into the neoplasm raises the question as to whether its origin may have been in a Meckel's diverticulum.

(4) The growth was difficult to remove because of its dense attachments. The entire left side of the pelvis was denuded of peritoneum. If the small intestines had been allowed to prolapse into this area, obstruction due to adherence and kinking would undoubtedly have ensued. The use of the Mikulicz pack as a mechanical barrier prevented this occurrence.

THE SURGICAL TREATMENT OF PROSTATIC DISEASE

CHARLES C. HIGGINS, M. D.

In surgical diseases of the prostate gland no one surgical procedure will adequately meet all the requirements because of variations in individual cases or because of coexisting pathologic processes. Since the introduction of the first operation for the obstructing prostate, refinements in operative technics and new procedures have been frequently advocated. By the application of an adequate preoperative routine the morbidity and mortality have progressively decreased to a point where there should be no hesitancy in recommending surgical intervention for the relief of prostatism. This has been especially true since the introduction of renal function tests, studies of blood chemistry correctly interpreted, and finally transurethral resection for removal of obstructing tissue.

PREOPERATIVE PREPARATION

Several factors have to be considered in the management of patients suffering from prostatism.

1. Introduction of infection into the bladder may occur quite easily. This is especially true as acute or chronic distention stretches the mucosa of the bladder and favors congestion producing predisposing factors essential to the production of cystitis. If vesical neck obstruction has existed over a long period of time, ureterectasis and pyelectasis may predispose to renal infection.

2. If infection of the bladder is present when the patient is first seen by the physician, precautions must be taken and trauma avoided or an acute exacerbation may follow poorly executed instrumentation. Although the importance of preoperative preparation for transurethral resection has been minimized recently, with this I cannot agree. Certainly an elderly patient with a blood urea of 30-40 mg./100 cc. is a better operative risk than if the level of the blood urea were 80-90 mg./100 cc. If transurethral resection were entirely devoid of complications, perhaps such preparation would not have to be recommended. Unfortunately, postoperative hemorrhage, pneumonia, epididymitis, and pulmonary embolism have been observed, and accordingly the patient should be in the best possible condition prior to operation regardless of the time required to attain this status.

The possibility of introducing infection into the bladder by a prolonged period of drainage with an indwelling urethral catheter should

be anticipated. Our preoperative management may be summarized under four headings.[1]

1. *Cases which require no inlying catheter and no catheterization except to determine the amount of residual urine.* These patients have typical obstructive urinary symptoms without complete retention and without a large amount of residual urine. No preliminary drainage is required if the blood urea is within normal limits and the renal function tests are satisfactory. In the absence of other complicating factors we have no hesitancy in carrying out operation one or two days after admission.

2. *Patients with acute urinary retention of recent onset and without evidence of preexisting infection of the bladder.* These patients are catheterized every eight hours, or more frequently if necessary. Again when the blood urea is not elevated and the renal function tests are within normal limits, operation is carried out a few days after admission.

3. *Patients who have enlarged, distended bladders, or acute retention with a high blood urea and diminished renal function.* We prefer to perform a suprapubic puncture in these patients, and we also believe a period of preoperative drainage is essential (Figs. 1 and 2). (The inlying catheter is rarely employed and, if so, is used only in patients who have badly infected bladders or have worn an inlying catheter for some time).

The foregoing procedures not only have reduced the preoperative morbidity and mortality but have definitely reduced the operative mortality, and have resulted in a more satisfactory postoperative convalescence.

Cystoscopy is not a routine procedure prior to transurethral resection. Urethral instrumentation with its attendant trauma and potential risk of introducing infection usually can be avoided. In cases in which a question arises as to the type of surgical procedure to be advocated, cystoscopy is justified. Although by omitting such diagnostic procedures, the presence of a vesical diverticulum or a small calculus not discernible on the initial roentgenogram may be overlooked, this is of little consequence. A stone visualized at operation is readily removed by litholapaxy. Many diverticulae do not produce symptoms after removal of the obstructing prostate. If, however, a diverticulum continues to produce symptoms after relief of the vesical neck obstruction, it may be removed later by the suprapubic route.

FLUID INTAKE

In the uncomplicated case the fluid intake should be maintained at approximately 3000 cc. In patients with an elevation of the blood

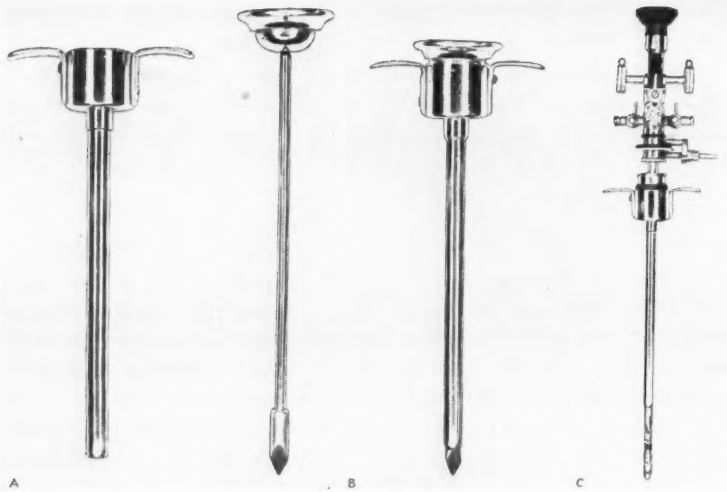


FIGURE 1

A. Cannula and trocar.
B. Instrument assembled.
C. The McCarthy Cystoscope is inserted into the cannula for visualization of the bladder

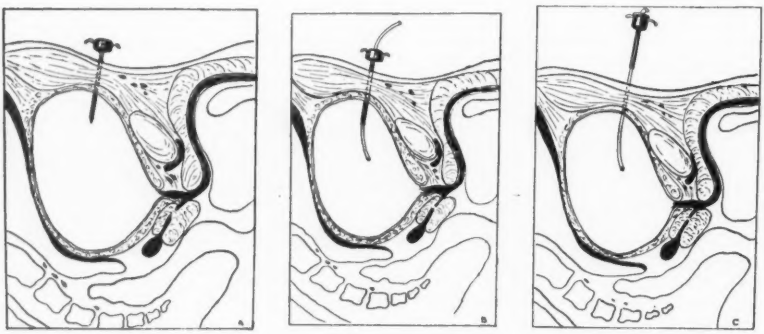


FIGURE 2

A. The trocar and cannula have been plunged into the bladder.
B. The trocar has been removed, and a No. 18 catheter inserted through the cannula into the bladder.
C. The cannula has been withdrawn, leaving the catheter in situ for suprapubic drainage.

urea, fluids are administered intravenously. The amount of physiological salt solution thus administered should not exceed 1500-1800 cc. in order to avoid the production of edema. If additional fluid is indicated for intravenous administration, a 5 per cent solution of dextrose may be utilized.

In treating elderly debilitated patients, coexisting diseases such as cardiac diseases, hypertension, diabetes, arteriosclerosis, etc. must be adequately treated during the preoperative period.

OPERATION

The operative procedure to be employed is frequently influenced by the training of the urologic surgeon and his familiarity with the various surgical procedures. He should be intimately acquainted not only with the technic of transurethral resection but also with that of perineal or suprapubic prostatectomy. Individualization of the patient is of paramount importance, and the indicated procedure is that followed by the most gratifying end results with the lowest morbidity and mortality. By any of the three procedures, the obstructing tissue can be adequately removed. The surgeon's skill in any one of the operative technics influences the end results in the individual case, but certain limitations as emphasized by Orr[2] must be placed upon the claims for any operation. Somewhere within these limitations will be found the optimum which will produce the most satisfactory results.

The prime objective of prostatic surgery is the relief of obstruction. With the introduction of transurethral resection for the relief of prostatism, criticism flourished. Sufficient time has now elapsed since its introduction to establish it firmly in our armamentarium of surgical procedures.

Having established the type of prostatic disease in the individual case, the question arises as to the surgical procedure which will effect a cure. The next considerations are the limitations of the procedures.

Should transurethral resection, as advocated by some surgeons, be the routine procedure? Should all glands regardless of size be removed by this technic? Is it the proper procedure when in Caulk's Clinic[3] 20 per cent of vesical neck obstructions have been found to be malignant? As familiarity with a procedure is increased our end results improve, the mortality and morbidity decrease, while the range of operability increases. It is my belief that over 90 per cent of patients suffering from prostatism can be offered prompt and permanent relief by transurethral resection. In certain instances I prefer either suprapubic or perineal prostatectomy.

In an enormous gland intravesical in type, I prefer removal by the suprapubic route. However, as experience increases, relatively larger hyperplastic masses may be removed transurethrally. Again, the posterior lobe of the prostate containing an early malignant neoplasm cannot be removed by either the suprapubic route or by transurethral resection.

Although gratifying results are being secured by orchidectomy for carcinoma of the prostate, I am still of the opinion that if the growth can be completely removed by perineal prostatectomy, it is the preferable procedure. The posterior lobe of the prostate and the false prostatic capsule are separated from the hyperplastic tissue in the prostate by a distinct line of cleavage. This permits enucleation of the hyperplastic mass leaving the posterior lobe behind. It is estimated that 75 per cent of carcinomas of the prostate arise in the posterior lobe. I believe, therefore, in instances in which a small hard nodule is palpable by rectal examination not only in the posterior lobe of the prostate but also in the lateral lobes, perineal removal of the gland is the preferable procedure.

Certainly cardiac disease renders some elderly patients unsuitable for surgical prostatectomy. In this group transurethral resection can be utilized to afford the patient complete relief of symptoms after adequate preoperative preparation. There is a definite increase in the number of patients over 70 years of age in whom complete relief of symptoms can be offered by transurethral resection with an extremely low operative mortality in whom surgical prostatectomy would be attended by considerable operative risk. As Kretschmer[4] has stated "the older and feebler they are the more justification there is for transurethral resection". As a result, I believe, of the low mortality rate secured by transurethral resection, the number of patients seeking relief at an early date is steadily increasing. Complications of chronic prostatism are not as frequently observed now as they were previously.

CARCINOMA OF THE PROSTATE

The incidence of carcinoma of the prostate is higher than is generally recognized. When it is observed that one of every 5 to 7 patients past the age of 50, as stated by Henline,[5] has carcinoma of the prostate, the serious aspect of this disease may be appreciated.

In the late Dr. John Caulk's Clinic 20 per cent of vesical neck obstructions have been found to be malignant. This percentage has been substantiated by postmortem findings: Rich[6] 14 per cent; Walthard[7] 30 per cent; Dossot[8] 18 per cent, and Moore[9] 16.7 per cent.

Geraghty[10] has also stated that carcinoma of the prostate begins in the posterior lobe in 75 per cent of the cases; Barringer,[11] Dossot[8] and others state carcinoma may begin anywhere inside the prostatic capsule, and Dossot observed that 11.6 per cent of adenomas of the prostate underwent malignant degeneration.

Perineal prostatectomy is, I believe, the procedure of choice for carcinoma of the prostate if it can be removed in its entirety. In most cases, however, when the patient is first observed by the physician, complete surgical removal is a technical impossibility. In this latter group if obstructive symptoms are present, transurethral resection is indicated, followed or preceded by bilateral orchidectomy. In the absence of obstructive symptoms and residual urine, bilateral orchidectomy alone suffices.

Sufficient time has not elapsed to warrant making definite statements as to the ultimate result of orchidectomy. Up to the present time, however, the results are extremely gratifying. Munger[12] has secured similar results by the application of deep x-ray therapy to the testicles, which in some instances may be the preferable procedure.

VASECTOMY

Although many urologic surgeons advocate bilateral vasectomy as a routine procedure prior to transurethral resection, it has been my experience that the incidence of epididymitis following operation is so extremely low that routine vasectomy is unnecessary. Exceptions may occur as when the patient has had an indwelling catheter for some time before admission, or has had repeated mild attacks of epididymitis.

CONCLUSIONS

1. Patients should be individualized, and the type of operation recommended is influenced by the findings in the individual case.

2. Over 90 per cent of patients suffering from prostatism may be promptly and permanently cured by transurethral resection. The goal of the resectionist is a transurethral prostatectomy.

3. Bars, median lobe hypertrophy, contractures, small fibrous prostates, and large adenomas of the prostate may be adequately treated by transurethral resection.

4. A difference of opinion exists as to the preferable treatment for the very large adenomas of the prostate.

5. Perineal exposure permitting removal of the entire gland as well as the posterior lobe of the prostate is the preferable treatment at the present time for early malignant neoplasm of the prostate.

6. Orchidectomy with or without transurethral resection is advocated for advanced malignant neoplasms of the prostate when perineal prostatectomy is technically impossible due to the extent of the disease.

REFERENCES

1. Engle, W. J.: Preoperative prostatic mortality, J. Urol. 41:505-514 (April) 1939.
2. Dorman, H. N.: Transurethral prostatic resection: A statistical study based on 300 consecutive cases. (Discussion by L. M. Orr), J. Urol. 45:432-433 (March) 1941.
3. Caulk, J. R.: Infiltration anesthesia of the internal vesical orifice for the removal of minor obstructions: Presentation of a cautery punch. J. Urol. 4:399-408 (October) 1920. Obstructive lesions of prostate, influence of author's cautery punch operation in decreasing necessity for prostatectomy, J.A.M.A. 94:375-381 (February 8) 1930.
4. Kretschmer, H. L.: Technic and end-results in transurethral prostatic resection. Surg. Clin. N.A. 19:177-190 (February) 1939.
5. Henline, Roy B.: The surgical treatment of prostatic disease. J.A.M.A. 117:2030-2034 (December 13) 1941.
6. Rich, A. R.: On frequency of occurrence of occult carcinoma of prostate. J. Urol. 33:215-223 (March) 1935.
7. Walthard, B.: Die Haufigkeit und Histogenese des Prostatacarcinomas. Ztschr. f. urol. Chir. u. Gynaek 43:488-496, 1937.
8. Dossot, R.: Cancer of prostate; its origin and extension. J. Urol. 23:217-245 (February) 1930.
9. Moore, R. A.: The morphology of small prostatic carcinoma. J. Urol. 33:224-234 (March) 1935.
10. Geraghty, J. T.: Treatment of malignant disease of prostate and bladder. J. Urol. 7:33-65 (January) 1922.
11. Barringer, B. S.: Prostatic carcinoma. J. Urol. 33:616-620 (June) 1935.
12. Munger, A. D.: Personal communication.

MYOTONIA ACQUISITA (Talma's Disease)

Report of a Case

WM. A. NOSIK, M. D. and E. W. SHANNON, M. D.

Myotonia acquisita is a rare disease first described by Talma in 1892. It is characterized by an increased muscular rigidity and spasm when movement is initiated, as well as a decrease in the power of relaxation even when the muscle is at rest. The myotonic reaction is also present, namely, a normal mechanical and electrical excitability of the motor nerves but an abnormally heightened mechanical and electrical excitability of the muscle. It differs from Thomsen's disease or myotonia congenita in that it is not congenital and usually develops in adult life following trauma, acute infection, or intoxication. Also it tends to improve spontaneously or go on to complete recovery, whereas, Thomsen's disease progresses through childhood to become stationary in adult life. The onset of the disease is variable and may be characterized by weakness, pain, or flaccid paralysis.

Krabbe[1] in 1934 reviewed the literature and found 34 cases of myotonia acquisita, while Moore[2] added another to the series in 1935. All of these cases were in men, the ages varying from 15 to 50 years in the 29 cases where the ages were reported.

CASE REPORT

The case reported here is that of a 45 year old white housewife who came to the Clinic with the complaint of "cramping of muscles and swelling of the joints." In 1936 following a panhysterectomy for menorrhagia she developed her first symptom of cramping pain in the right calf with radiation down to the foot. This pain was not related to exercise and would often awaken the patient during the night. The pain would be so severe that the foot would become inverted and plantar flexed. Four months later she developed a severe depression for which she was confined to a sanatorium. While she was in this institution, the pains became worse and spread to the other calf and to both arms. Fibrillary twitching of the muscles was noted in 1937, but it soon disappeared even though the cramping sensations persisted.

During the year previous to admission the patient noticed swelling of various joints of the body, particularly those of the hands, shoulders, and ankles. Motion of the involved joints was painful. During this same period, the patient gained 20 pounds. She stated that she had had practically a constant "spasm" of her right calf for 4 years. She then developed a cramping sensation in the left arm and shoulder girdle, and in the muscles of her back. The right side was also involved for several years, but only during the year previous to admission did it retard the movements of that side.

Personal history revealed that the patient was married and had 4 children living and well, ranging from 11 to 24 years of age. No previous illnesses other than a "nervous breakdown" in 1937 was elicited. She had had shortness of breath on exertion as well as ankle edema for the past 4 years. Occasional attacks of paroxysmal nocturnal dyspnea had been noted during the past 10 years. The patient had always been of a nervous

temperament. There had been an exaggeration of this symptom following the surgical menopause in 1936. The past history was otherwise negative.

The general physical examination was essentially normal except for (1) an upper dental plate; (2) inflamed fauces; (3) slightly enlarged cervical lymph glands; (4) tenderness to pressure over left lower ribs; (5) pitting edema of the legs. The neurological examination was normal.

Concerning the myotonic phenomena, the right calf was in a continuous state of contraction. The grip of the right hand was the same as that of the left although it became much slower on repeated opening and closing. Striking the muscle induced a slow contraction. Reflexes were all brisk and nonpathological. Faradic and galvanic stimulation of the motor nerves was normal. She was seen by one of us (W.A.N.), and the diagnosis of myotonia acquisita was made.

Her heart was normal. Accordingly it was thought that the edema might be improved by a low sodium high potassium diet in that the edema could be due to retention of electrolytes.* The patient was started on this therapy and lost 16 pounds even though the caloric intake was not changed. However, the pain and muscle cramps increased in frequency and severity under this form of treatment.

A piece of the right gastrocnemius muscle was taken for biopsy. Sections of it showed normal striated muscle with areas of degeneration and hyalinization of muscle fibers. Some fibrosis of the intermuscular septa was present without a sign of active inflammatory reaction, parasites, or neoplasm.

SUMMARY

There were no apparent etiological factors such as infection or intoxication in this case, although the surgery she had undergone might be interpreted as the traumatic incident which occasionally precipitates this syndrome. Pain was the outstanding symptom.

There was no hypertrophy of the muscles although the myotonic syndrome was present. The patient was unable to relax the affected muscles or to initiate a rapid movement. The myotonic reaction to electrical and mechanical stimulus was observed.

Although Krabbe[1] stresses the presence of a neuritis or polyneuritis in the majority of cases of myotonia acquisita. No evidence of such a lesion was found in this patient.

The patient was older than most of the men who had developed this condition. This case is of unusual interest in that we believe it is the first of its kind reported to have occurred in a woman.

**Under the direction of Dr. E. P. McCullagh.*

BIBLIOGRAPHY

1. Krabbe, K. H.: The myotonia acquisita in relation to the postneuritic muscular hypertrophy. Brain, 57:184-194 (June) 1934.
2. Moore, M. T.: Myotonia acquisita. A case showing myotonia in both lower limbs following injury. Am. J. Syph. & Neuro. 19:409-413 (July) 1935.
3. Bing, R.: Textbook of Nervous Disease. (5th. ed.; St. Louis: Mosby, 1939) p. 177-178.

DIVERTICULUM OF THE ESOPHAGUS

Report of Two Cases

R. S. DINSMORE, M.D.

INTRODUCTION

The two cases of diverticulum of the esophagus which are herein reported occurred in brothers, aged 61 and 51. The lesions were almost identical in location and size. Each patient had known for several years that he had a diverticulum, and each came to operation because of difficulty in swallowing. A third brother, aged 38, had no x-ray evidence of a diverticulum. He has not had an esophagoscopy.

Although there is considerable doubt as to whether these lesions are congenital, the occurrence of these two cases in brothers suggests the possibility. Boyd[1] denies a congenital origin of diverticulum of the esophagus, and Perrone[2] states that he has found only two instances in the literature in which the writers were certain of the diagnosis. Jackson and Shallow[3] reported a case in a child 8 years of age, who discharged particles of food through the external chest wound following a rib resection. At autopsy a small tube was found springing from the posterior lateral wall of the esophagus. Further exploration showed that it opened into the chest, which led them to believe that it was a congenital lesion. Rush and Stingily[4] reported a case in an infant who died at the age of 20 days with a swelling at the side of the neck. At autopsy they found what appeared to be a true congenital diverticulum.

CASE REPORTS

Case 1: The patient, a 61 year old man, had always been in good health. His chief complaint was "throat trouble". For an indefinite time he had had a gurgling in his throat and had regurgitated food several hours after eating. No swelling or pain in his neck had been noticed. An x-ray taken 4 years prior to examination had revealed a diverticulum, about 3 x 3 mm., situated in the upper third of the esophagus.

The general physical examination was normal. The patient's height was 65 inches and his weight 162 pounds. The blood pressure was 120/80. The urine was normal. The blood count showed 4,560,000 red blood cells, 87 per cent hemoglobin, and 4,200 white blood cells. The blood sugar was 105 mg. per cent, and the blood urea 30 mg. per cent, fasting. The Wassermann and Kahn tests were negative. X-ray examination showed that the diverticulum did not extend into the superior mediastinum, but had increased to about twice its size on the previous film. Excision of the diverticulum was advised.

At the beginning of the operation an unsuccessful attempt was made to pass a Levine tube into the stomach. The patient was given 70 mg. of avertin, and an esophagoscope was passed. It was impossible, however, to pass the Levine tube by means of the esophagoscope beyond the site of the diverticulum, and the procedure was abandoned.

A transverse thyroid incision was made, and the skin flaps dissected upward and downward. The muscles were separated longitudinally over the left lobe of the thyroid, which was retracted mesially and anteriorly. The diverticulum was easily located and dissected downward to its neck. The opening of the diverticulum was closed with No. 0-0-0 chromic interrupted catgut sutures and reinforced by a row of interrupted No. 0 silk sutures. A small piece of iodoform gauze, the end of which was covered with vaseline, was placed just below the site of the closure. The muscles were approximated with No. 0-0-0 catgut sutures, and the skin was closed with clips.

After traction had been placed on the sac through an esophagoscope, an attempt was made to pass a Levine tube into the stomach. Before the patient left the operating table, however, the tube had come back into the mouth. No attempt was made to reinsert it.

The sac was globular in shape and measured about 2 cm. in diameter. The wall was about 2 mm. thick, and the mucosa was smooth and white. Histologically, microscopic section showed normal squamous epithelium on the mucosal surface. A small amount of muscular tissue was present in the wall of the sac.

The postoperative course was uneventful. The highest temperature was 100.6°F. Immediately after the operation 2000 cc. of 3 per cent glucose in saline was given by hypodermoclysis, and 3000 cc. of 5 per cent glucose in saline was administered intravenously daily for two days. Sips of water were allowed at the end of 48 hours; on the fifth postoperative day a liquid diet was allowed; and on the seventh postoperative day a soft diet was begun. The patient had no difficulty in swallowing and was discharged on the tenth postoperative day.

Case 2: A man aged 51 complained of a choking sensation and a slight soreness in the throat. Seven years ago he had begun to notice an occasional choking sensation while eating and at infrequent intervals during the night. The attacks had gradually increased in intensity, and at the time of examination he stated that he felt as though something was stuck in the throat. For 5 years the patient had experienced a sensation of food coming back into his pharynx immediately after eating. This discomfort which always seemed to be in the midline, just below the larynx, could be relieved by the act of swallowing or by drinking water, or by manipulating the neck so as to empty the pouch by pressure. Nausea or expectoration of blood were not experienced. He had relatively little difficulty in taking fluids. X-rays taken 5 years previously showed a small diverticulum, which had enlarged to the size shown (Fig. 1).

The past history revealed that several years ago he had had two attacks of right-sided renal colic. A flat x-ray plate of the abdomen showed small stones in the region of the right kidney pelvis.

The patient was a short, obese individual, 66 inches tall, weighing 187 pounds, and appeared to be in excellent health. The pulse rate was 86, and the blood pressure 116/64; the temperature was normal. The physical examination rêvealed a few fine crepitant râles over the base of the left lung posteriorly. The impression of the examiner was diverticulum of the esophagus and obesity.

Laboratory studies: The urine was normal. The blood count was 5,180,00 red blood cells, 94 per cent hemoglobin, and 11,300 white blood cells. The differential count showed 52 per cent polymorphonuclear neutrophiles, 4 per cent eosinophiles, 1 per cent basophiles, 41 per cent lymphocytes, and 2 per cent monocytes. The blood sugar was 114 mg. per cent, and the blood urea was 39 mg. per cent, fasting. The Wassermann and Kahn tests were negative.

The x-ray of the chest showed increased fibrotic infiltration with extension into the peripheral zones and some small calcified glands at both hili. Excision of the diverticulum was advised.

Satisfactory anesthesia was obtained with 70 mg. of avertin and supplementary gas, oxygen, and ether. A Hasslinger esophagoscope was introduced, and the internal open-

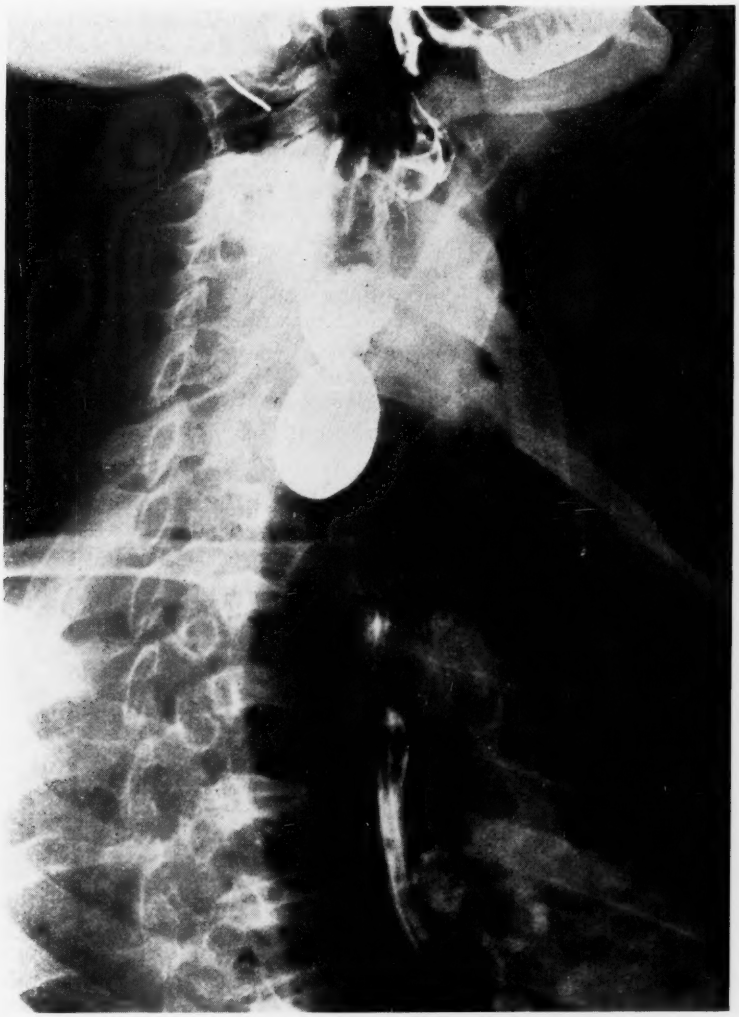


FIGURE 1

ing of the diverticulum was noted. A transverse incision was made midway between the thyroid cartilage and the suprasternal notch. The skin flaps were dissected for a short distance upward and downward, and an oblique incision was made through the prethyroid muscles. The left lobe of the thyroid was retracted mesially, and the esophageal diverticulum identified and dissected free. The diverticulum was about 2½ inches long, the neck of the sac being opposite the cricoid cartilage. The stump of the diverticulum was closed with continuous No. 0-0-0 chromic catgut sutures and reinforced by fine interrupted sutures through the muscularis. A cigarette drain was placed just below the lower angle of the anastomosis. A Levine tube was then passed through the esophagoscope into the stomach. The preglandular muscles were reapproximated with interrupted No. 0-0-0 chromic catgut sutures, and the skin was closed with clips.

The postoperative course was uneventful, and the patient was discharged on the ninth postoperative day, free from symptoms.

DISCUSSION

For many years there has been a discussion as to whether or not an esophageal diverticulum is best treated by a one or a two-stage operation. The excellent results in a large series of cases reported by Lahey[5, 6] and Shallow[7, 8] indicate that either is a satisfactory method. Jackson,[3, 9, 10, 11] Shallow,[7, 8] and Eliason,[12, 13] have done the operations in one stage, while C. H. Mayo,[14] Pool,[15] and Lahey,[5, 6] have used a two-stage procedure.

Mediastinitis has not been a complication in the many cases reported. Moynihan[16] has stated that this complication has been overemphasized. Shallow[7, 8] is in accord and in 104 cases has not reported a single instance of mediastinitis.

Dr. Lahey always does a two-stage operation, without using an esophagoscope and with periodic postoperative dilatations. Jackson and his group devised the preliminary passing of a leaded thread, and later the insertion of a duodenal tube over this thread, routine esophagoscopy, and the use of the esophagoscope at operation, with no postoperative dilatation.

I have performed the operation with 3 technics: (1) a two-stage procedure, (2) a one-stage procedure, and (3) a modification. In the modified technic the sac is ligated, and a small pack is placed in the operative wound and is removed at the end of 48 hours. Two or three sutures are then placed in the preglandular muscles, and the skin closed with clips. In the uncomplicated case I prefer to do the one-stage operation, following Shallow's[7, 8] technic of handling the stump. On the other hand I have had cases in which it has been a distinct advantage to do the two-stage procedure. My own preference for the one-stage operation

is that at the primary operation the stump is much more easily handled with a much better apposition of all the layers. Likewise, the use of an esophagoscope allows one to see the sac distinctly, and also at the completion of the operation a duodenal tube may be easily inserted if this has not been done preoperatively. Undoubtedly, the use of the duodenal tube has helped greatly in these cases, as the tube can be left in place for 5 or 6 days and a normal caloric and electrolytic intake maintained by feeding the patient through the tube.

Babcock suggested that a transverse incision be made in these cases. I have used this satisfactorily, simply making an ordinary thyroid incision and then dividing the preglandular muscles longitudinally and exposing the lobe of the thyroid, and retracting it mesially. This provides adequate exposure and leaves a much less noticeable scar than does an incision made longitudinally. In neither of these cases was it necessary to ligate any of the thyroid vessels, although Shallow[7, 8] has stated that in 35 per cent of his series some vessels had to be ligated. On the other hand, Eliason[12, 13] reported only one case in which this was necessary.

The duodenal tube is usually removed on the fifth or sixth day, and on the following day the patient is allowed small quantities of fluids. Occasionally, the patient will complain about irritation from the tube. The second patient reported insisted that when he coughed the movement of the tube caused him discomfort. Therefore, if the patient has a good deal of mucus the tube should be removed earlier, as these patients do well for a few days with nothing by mouth and intravenous glucose. The Penrose drain is loosened on the third day and ordinarily removed on the fifth. I have not practised a postoperative dilatation. The patients are given as little sedation as possible, since, as has been emphasized by many writers, the cough reflex should not be abolished.

In both of the reported cases, the sac was closed after putting two guide sutures in the fundus of the sac. The neck of the sac was closed with a running suture of No. 0-0-0 chromic catgut, and apposition of the muscularis over this with fine interrupted stitches. Shephard[17] has devised a small clamp with which the base of the diverticulum is grasped, and the sac is excised; then, with a fine running suture of No. 0-0-0-0-0 chromic catgut over the clamp, as in intestinal work, the base of the sac is closed. I believe, however, that Shallow's technic is the most satisfactory.

SUMMARY

Two cases of diverticulum of the esophagus are reported which were operated upon by a one-stage procedure. Although these cases occurred in brothers, there was no evidence to show that they were congenital.

BIBLIOGRAPHY

1. Boyd, William: Surgical Pathology (Philadelphia: W. B. Saunders Co. 1925) p. 231.
2. Perrone, Joseph A.: Diverticula of the esophagus. The Laryngoscope, 46:899-921, 1936.
3. Jackson, C., and Shallow, T. A.: Diverticula of esophagus, pulsion traction, malignant and congenital. Ann. Surg. 83:1-19 (January) 1926.
4. Rush, Leslie V., and Stingily, C. R.: Congenital diverticulum of esophagus. Case report. South. Med. Jour. 22:546-548 (June) 1929.
5. Lahey, F. H.: Surgical management of pharyngoesophageal diverticulum based upon experience with 21 cases. Trans. South. S. A., 42:421-434, 1929. Surg. Gynec. & Obst., 51:227-236, 1930.
6. Lahey, Frank: The management of pulsion esophageal diverticulum. J. A. M. A. 109:141-149 (October) 1937.
7. Shallow, T. A.: Combined one stage closed method for the treatment of pharyngea diverticula. Surg., Gynec., & Obst., 62:624-633, 1936.
8. Shallow, T. A.: Pharyngeal diverticulum. Jour. of Inter. Coll. of Surg., 2:48-52, 1939.
9. Jackson, Chevalier: Bronchoscopy and Esophagoscopy (2nd ed.; Philadelphia: W. B. Saunders & Co. 1926).
10. Jackson, Chevalier: Peroral Endoscopy and Laryngeal Surgery (St. Louis: The Laryngoscope Co. 1914) pp. 544-545.
11. Jackson, Chevalier, and Babcock, W. W.: One-stage operation with esophagoscopic assistance (Diverticulum of the esophagus). Surg. Clin. N. A., 10:1249-1263 (December) 1930.
12. Eliason, E. L.: Esophageal diverticulum (cervical). Surg. Clin. N. A., 3:163-169 (February) 1923.
13. Eliason, E. L., et al.: Esophageal diverticula. Surgery, 2:188-195 (August) 1937.
14. Mayo, C. H.: Treatment of diverticulum of esophagus. Ann. Surg., 77:267-271 (March) 1923.
15. Pool, E. H.: Diverticulum of the esophagus, two-stage operation. Ann. of Surg., 95:151-153 (January) 1932.
16. Moynihan, Sir Berkeley: Correspondence. Surg., Gynec., & Obst. 54:128, 1923.
17. Shephard, John Hunt: Pharyngeoesophageal diverticula. Calif. and Western Med., 51:156-159, 1931.